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- (71) Applicant (*for AE, AU, BB, CA, CY, GB, GD, GH, GM, IE, IL, KE, LC, LK, LS, MN, MW, MZ, NZ, SD, SG, SL, SZ, TT, TZ, UG, ZA, ZW only*): UNILEVER PLC [GB/GB]; Unilever House, Blackfriars, London EC4P 4BQ (GB).
- (71) Applicant (*for all designated States except AE, AU, BB, CA, CY, GB, GD, GH, GM, IE, IL, IN, KE, LC, LK, LS, MN, MW, MZ, NZ, SD, SG, SL, SZ, TT, TZ, UG, ZA, ZW*): UNILEVER NV [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL).
- (71) Applicant (*for IN only*): HINDUSTAN LEVER LIMITED [IN/IN]; Hindustan Lever House, 165/166 Backbay Reclamation, Maharashtra, 400 020 Mumbai (IN).

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(54) Title: VIRTUAL MAKEOVER

(57) Abstract: A method and apparatus is provided for virtual colour makeover of a customer's face. A digital image is taken of the customer's face. Natural skin colour is determined by a differential analysis among at least two different sites along the face to identify an area without colour. The identified area without colour is then used as a basis for projecting the customer's face with the natural skin colour. Consultant's choice of pre-programmed colour palettes matching the measured natural skin colour is then projected on the facial image. A customer's personal choice such as fashion, natural or go-to-work looks can be registered for modifying the consultant's choice colour palette. The selected colour palette can then be identified as a set of colour cosmetic products, which are provided to the customer.

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VIRTUAL MAKEOVERField of the Invention

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The present invention relates to a method and apparatus for allowing a consumer at point-of-sale to evaluate colour cosmetic products on their virtual facial image prior to purchase.

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BACKGROUND OF THE INVENTION AND PRIOR ART

Colour cosmetics encompass among others lipsticks, eyeliner, blush, lipliner, eye shadow and facial foundation. A vast array of colours and shades are available to consumers. Often the consumer finds it difficult to select among this vast array of choices. It is difficult to decide how a particular colour or shade will look when actually spread on the skin. Even more difficult to assess is how a combination of colour cosmetic products such as facial foundation, lipstick and eye shadow will work together for a particular individual.

Systems have been developed to assist the decision process. Clinique and Clarion have installed computers at sales counters for use by the consumer. Information on colour shade, oiliness and other properties of a consumer's skin are punched into the computer which then determines the company's most closely matching product.

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Another point of sale technique has been that of custom blending. Two major companies, Prescriptives (division of Estee Lauder) and Visage (division of Revlon) begin a sale by manually evaluating a subject's skin colour. The sales person then adjusts existing finished foundations so as to

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match the evaluated skin colour for a perfect facial foundation. Unfortunately, the system is time consuming, requires extensively trained sales persons, and has poor reproducibility.

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U.S. Patent 5,854,850, U.S. Patent 5,825,941 and U.S. Patent 5,687,259 all to Linford et al. assigned to the Mirror Software Corporation disclose a system for digital image capture of a particular person's face and software to
10 manipulate facial structures. The system is intended for reconstructive plastic surgery.

It is evident that relatively unsophisticated systems are available for colour matching. The technology also exists
15 for digital recording of individual faces. To date there has been no disclosure of systems, which utilise digital imagery for cosmetic products. Neither has there been reported any systems for obtaining virtual makeover of a consumer's image whereby the consumer can see the effect of
20 different colour cosmetic products on their own face.

Accordingly, it is an advantage of the present invention to provide a method and apparatus for forming a virtual makeover of a person's face on an image monitor so as to
25 allow selection of the best colour combinations.

Another object of the present invention is to provide a method and apparatus for virtual makeover at a point of sale counter wherein colour makeup can be electronically painted
30 over the consumer's image without requiring actual removal of make-up prior to obtaining a baseline natural skin colour image.

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These and other objects of the present invention will become more apparent from the following summary and detailed description.

5 SUMMARY OF THE INVENTION

According to a first aspect, the present invention provides a method for applying a virtual makeover to a person's face, the method involving:

- 10 (i) directing a digital camera at a person's face to register an image of at least a portion thereof;
- (ii) calculating colour parameters on two or more areas of the image to identify a natural colour
- 15 of the skin;
- (iii) transmitting the image to a monitor for displaying the face;
- (iv) correlating the natural skin colour with a predetermined palette of colours appropriate to
- 20 the calculated natural skin colour;
- (v) locating areas of the face for application of a colour cosmetic;
- (vi) displaying the facial image with the predetermined colour palette on the located
- 25 areas; and
- (vii) optionally placing an order for colour cosmetics corresponding to the predetermined colour palette.

30 According to a further aspect, the present invention provides apparatus for applying virtual makeover to a person's face, the apparatus including:

- 35 (i) a digital camera for acquiring information on the person's facial image;

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- (ii) a program for calculating colour on two or more different areas of the facial image not normally covered by cosmetics to identify a natural colour of the person's skin;
- 5 (iii) a monitor for displaying the facial image;
- (iv) a program for painting a predetermined colour palette correlated with the natural skin colour onto certain located areas of the face normally subject to colour cosmetic treatment; and
- 10 (v) a printer delivering a printout of the predetermined colour palette.

DETAILED DESCRIPTION OF THE INVENTION

15 A problem with prior attempts to visualise colour cosmetics for customers has been the inability to determine their natural skin colour. Now it has been found that natural skin colour can be determined via digital imaging by comparing L*a*b colour values on at least two different

20 areas of the facial image. Consumers do not place makeup over 100% of their face. The digital scan identifies those areas of skin which are not covered by makeup, provides a colour value for that area and utilises the value as a baseline colour for re-imaging a cosmetically stripped face

25 onto a monitor.

Another challenge for the system was to locate those areas of the face upon which colour cosmetics can be applied electronically. The program locates colour requiring areas

30 such as the lips, cheeks and eyes.

A digital image of a customer's face may be taken at a point-of-sale department store counter for storage into a central memory and then made available at a website. The

35 image may also be storable locally at the store or within an

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intranet system of the cosmetic supplier. Also envisioned is the alternative possibility for the customer scanning their own actual image from their home computer. Many of these customers now have relatively inexpensive digital
5 imaging cameras interfaceable with personal computers and thereby can connect directly to the internet.

Once the natural skin colour has been identified, a consultant's choice is automatically determined from a
10 software stored set of 12-20 colours matching the person's skin type. This provides a colour matching facial foundation for building the first stage of colour makeover. Feedback is then accepted into the program on the customer's own preferences. For instance, these preferences can be
15 with respect to three possible "looks" such as fashion, natural or go-to-work types.

A lipstick can then be provided as a consultant's best choice. The customer can also provide input for her
20 favourite colour. The pick may be a natural or dramatic look. These choices are then fed directly into the program for facial display on the monitor.

Other colour cosmetics can be applied in the same
25 consultant's choice and consumer preference feedback mode. These cosmetics can include eye shadow, eyeliner, lipliner and blush. The monitor can display images from no makeup to full makeup with all products or any step in between.

30 When a particular look including all the necessary colour cosmetics have been selected, a printer is activated with an ordering slip for the selected cosmetics. The customer is identified by a number and the selected products given a barcode symbol or other designation correlating the product
35 with the customer.

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The customer's image can be placed on an internet site. At some subsequent time, the customer can view the Internet site and from the comfort of their own terminal evaluate various makeovers on their face. Cosmetics to accomplish the actual makeover can then be ordered on the web site or through any other channel.

Equipment for the method includes a digital camera available from several sources. Nikon provides a suitable high resolution digital camera under the trademark Coolpix 900™ providing an image size of 1080 x 960 pixels, VGA mode 640 x 480. Another digital camera, which may be utilised, is the PhotoGenie™ sold with the ePHOTO 1680 camera by the Agfa Corporation. Image size is 1280 x 1200 pixels, VGA mode 640 x 480. Software for operating the system can be obtained from Torchlight Corporation of Seattle. Programs upon which this software is based are found in U.S. Patent 5,854,850, U.S. Patent 5,825,941 and U.S. Patent 5,687,259 all herein incorporated by reference.

The foregoing description illustrates selected embodiments of the present invention and in light thereof variations and modifications would be suggested to one skilled in the art, all of which are within the scope of this invention.

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CLAIMS:

1. A method for applying a virtual makeover to a person's
5 face, the method comprising:

- (i) directing a digital camera at a person's face
to register an image of at least a portion
thereof;
- 10 (ii) calculating colour parameters on two or more
areas of the image to identify a natural colour
of the skin;
- (iii) transmitting the image to a monitor for
displaying the face;
- 15 (iv) correlating the natural skin colour with a
predetermined palette of colours appropriate to
the calculated natural skin colour;
- (v) locating areas of the face for application of a
colour cosmetic;
- 20 (vi) displaying the facial image with the
predetermined colour palette on the located
areas; and
- (vii) optionally placing an order for colour
cosmetics corresponding to the predetermined
colour palette.

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2. An apparatus for applying virtual makeover to a person's
face, the apparatus comprising:

- (i) a digital camera for acquiring information on
the person's facial image;
- 30 (ii) a program for calculating colour on two or more
different areas of the facial image not
normally covered by cosmetics to identify a
natural colour of the person's skin;
- (iii) a monitor for displaying the facial image;

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- (iv) a program for painting a predetermined colour palette correlated with the natural skin colour onto certain located areas of the face normally subject to colour cosmetic treatment; and
- 5 (v) a printer delivering a printout of the predetermined colour palette.

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- (71) Applicant (for all designated States except AE, AU, BB, CA, CY, GB, GD, GH, GM, IE, IL, IN, KE, LC, LK, LS, MN, MW, MZ, NZ, SD, SG, SL, SZ, TT, TZ, UG, ZA, ZW): **UNILEVER NV [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL).**
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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, IBM-TDB, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 728 982 A (ROBIN JEAN MARC) 5 July 1996 (1996-07-05)	2
Y	page 7, line 8 - line 51; claims 1-5 ---	1
Y	WO 97 29441 A (BECHARA SAMIR JACOB) 14 August 1997 (1997-08-14) abstract ---	1
Y	US 5 495 338 A (GOURIOU ELIANE ET AL) 27 February 1996 (1996-02-27) abstract ---	2
Y	EP 0 828 230 A (SHISEIDO CO LTD) 11 March 1998 (1998-03-11) column 9, line 1 -column 10, line 39 --- -/--	2



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Perez Molina, E

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 478 238 A (BAUDET REGINE ET AL) 26 December 1995 (1995-12-26) abstract ---	
A	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 10, 31 August 1999 (1999-08-31) & JP 11 143352 A (ONISHI NETSUGAKU KOGYOSHOKU), 28 May 1999 (1999-05-28) abstract ---	
A	EP 0 226 959 A (HORIYAMA TSUKASA) 1 July 1987 (1987-07-01) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/05409

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2728982 A	05-07-1996	AU 4452296 A WO 9621201 A	24-07-1996 11-07-1996
WO 9729441 A	14-08-1997	BR 9600543 A	30-12-1997
US 5495338 A	27-02-1996	FR 2690822 A CA 2134985 A DE 69301129 D EP 0569291 A EP 0646339 A WO 9321794 A JP 7506504 T DE 69301129 T ES 2085734 T	12-11-1993 11-11-1993 08-02-1996 10-11-1993 05-04-1995 11-11-1993 20-07-1995 04-07-1996 01-06-1996
EP 0828230 A	11-03-1998	JP 10075823 A US 6091836 A	24-03-1998 18-07-2000
US 5478238 A	26-12-1995	EP 0638261 A CA 2146134 A DE 69301239 D DE 69301239 T ES 2085741 T WO 9503727 A JP 2986214 B JP 8505078 T US 5797750 A	15-02-1995 09-02-1995 15-02-1996 14-08-1996 01-06-1996 09-02-1995 06-12-1999 04-06-1996 25-08-1998
JP 11143352 A	28-05-1999	NONE	
EP 0226959 A	01-07-1987	JP 62144280 A CA 1261967 A	27-06-1987 26-09-1989